



Phylogenetic diversity and predictive functional profile of bacteria associated with marine microalgae, *Isochrysis galbana* using next generation sequencing

SV Sandhya^{1*#} & KK Vijayan²

¹ICAR-Central Marine Fisheries Research Institute (CMFRI), Kochi - 682 018, Kerala, India

²ICAR-Central Institute of Brackishwater Aquaculture (CIBA), Chennai - 600 028, Tamil Nadu, India

Supplementary Data

OTU ID	Count of functional gene	KEGG pathways
Transporters	35447429	Environmental Information Processing; Membrane Transport; Transporters
General function prediction only	23935952	Unclassified; Poorly Characterized; General function prediction only
ABC transporters	21871313	Environmental Information Processing; Membrane Transport; ABC transporters
Photosynthesis proteins	16644527	Metabolism; Energy Metabolism; Photosynthesis proteins
DNA repair and recombination proteins	15114093	Genetic Information Processing; Replication and Repair; DNA repair and recombination proteins
Photosynthesis	13128317	Metabolism; Energy Metabolism; Photosynthesis
Peptidases	13003407	Metabolism; Enzyme Families; Peptidases
Two-component system	12583123	Environmental Information Processing; Signal Transduction; Two-component system
Purine metabolism	12323004	Metabolism; Nucleotide Metabolism; Purine metabolism
Porphyrin and chlorophyll metabolism	12236839	Metabolism; Metabolism of Cofactors and Vitamins; Porphyrin and chlorophyll metabolism
Ribosome	11532093	Genetic Information Processing; Translation; Ribosome
Chromosome	9385660	Genetic Information Processing; Replication and Repair; Chromosome
Oxidative phosphorylation	9078679	Metabolism; Energy Metabolism; Oxidative phosphorylation
Secretion system	8806264	Environmental Information Processing; Membrane Transport; Secretion system
Function unknown	8448876	Unclassified; Poorly Characterized; Function unknown
Others	8315699	Unclassified; Metabolism; Others
Arginine and proline metabolism	8186979	Metabolism; Amino Acid Metabolism; Arginine and proline metabolism
Pyrimidine metabolism	7922248	Metabolism; Nucleotide Metabolism; Pyrimidine metabolism
Amino acid related enzymes	7108754	Metabolism; Amino Acid Metabolism; Amino acid related enzymes
Amino sugar and nucleotide sugar metabolism	7057529	Metabolism; Carbohydrate Metabolism; Amino sugar and nucleotide sugar metabolism
Bacterial motility proteins	6980830	Cellular Processes; Cell Motility; Bacterial motility proteins
Glycolysis / Gluconeogenesis	6946214	Metabolism; Carbohydrate Metabolism; Glycolysis / Gluconeogenesis
Chaperones and folding catalysts	6863116	Genetic Information Processing; Folding, Sorting and Degradation; Chaperones and folding catalysts
Pyruvate metabolism	6665683	Metabolism; Carbohydrate Metabolism; Pyruvate metabolism
Replication, recombination and repair proteins	6438722	Unclassified; Genetic Information Processing; Replication, recombination and repair proteins
Ribosome Biogenesis	6427515	Genetic Information Processing; Translation; Ribosome Biogenesis
Methane metabolism	6383639	Metabolism; Energy Metabolism; Methane metabolism
Protein folding and associated processing	6289864	Unclassified; Genetic Information Processing; Protein folding and associated processing
Aminoacyl-tRNA biosynthesis	6123326	Genetic Information Processing; Translation; Aminoacyl-tRNA biosynthesis
Transcription factors	5685363	Genetic Information Processing; Transcription; Transcription factors
Alanine, aspartate and glutamate metabolism	5409575	Metabolism; Amino Acid Metabolism; Alanine, aspartate and glutamate metabolism
Starch and sucrose metabolism	5290747	Metabolism; Carbohydrate Metabolism; Starch and sucrose metabolism

DNA replication proteins	5280034	Genetic Information Processing; Replication and Repair; DNA replication proteins
Translation proteins	5210750	Unclassified; Genetic Information Processing; Translation proteins
Other ion-coupled transporters	5202112	Unclassified; Cellular Processes and Signaling; Other ion-coupled transporters
Pentose phosphate pathway	5031210	Metabolism; Carbohydrate Metabolism; Pentose phosphate pathway
Carbon fixation in photosynthetic organisms	4544810	Metabolism; Energy Metabolism; Carbon fixation in photosynthetic organisms
Carbon fixation pathways in prokaryotes	4528574	Metabolism; Energy Metabolism; Carbon fixation pathways in prokaryotes
Cysteine and methionine metabolism	4517463	Metabolism; Amino Acid Metabolism; Cysteine and methionine metabolism
Valine, leucine and isoleucine biosynthesis	4482610	Metabolism; Amino Acid Metabolism; Valine, leucine and isoleucine biosynthesis
Phenylalanine, tyrosine and tryptophan biosynthesis	4429212	Metabolism; Amino Acid Metabolism; Phenylalanine, tyrosine and tryptophan biosynthesis
Homologous recombination	4410033	Genetic Information Processing; Replication and Repair; Homologous recombination
Fructose and mannose metabolism	4378575	Metabolism; Carbohydrate Metabolism; Fructose and mannose metabolism
Transcription machinery	4325270	Genetic Information Processing; Transcription; Transcription machinery
Glycine, serine and threonine metabolism	4235382	Metabolism; Amino Acid Metabolism; Glycine, serine and threonine metabolism
Protein kinases	4197492	Metabolism; Enzyme Families; Protein kinases
Lipid biosynthesis proteins	4125167	Metabolism; Lipid Metabolism; Lipid biosynthesis proteins
Ubiquinone and other terpenoid-quinone biosynthesis	4040474	Metabolism; Metabolism of Cofactors and Vitamins; Ubiquinone and other terpenoid-quinone biosynthesis
Peptidoglycan biosynthesis	4006813	Metabolism; Glycan Biosynthesis and Metabolism; Peptidoglycan biosynthesis
Mismatch repair	3986206	Genetic Information Processing; Replication and Repair; Mismatch repair
Pores ion channels	3948918	Unclassified; Cellular Processes and Signaling; Pores ion channels
Signal transduction mechanisms	3857111	Unclassified; Cellular Processes and Signaling; Signal transduction mechanisms
Glycosyltransferases	3846287	Metabolism; Glycan Biosynthesis and Metabolism; Glycosyltransferases
Pantothenate and CoA biosynthesis	3807526	Metabolism; Metabolism of Cofactors and Vitamins; Pantothenate and CoA biosynthesis
RNA degradation	3725658	Genetic Information Processing; Folding, Sorting and Degradation; RNA degradation
Nitrogen metabolism	3723136	Metabolism; Energy Metabolism; Nitrogen metabolism
Energy metabolism	3439693	Unclassified; Metabolism; Energy metabolism
Terpenoid backbone biosynthesis	3373341	Metabolism; Metabolism of Terpenoids and Polyketides; Terpenoid backbone biosynthesis
Membrane and intracellular structural molecules	3324443	Unclassified; Cellular Processes and Signaling; Membrane and intracellular structural molecules
Photosynthesis - antenna proteins	3288824	Metabolism; Energy Metabolism; Photosynthesis - antenna proteins
Glyoxylate and dicarboxylate metabolism	3275023	Metabolism; Carbohydrate Metabolism; Glyoxylate and dicarboxylate metabolism
Prenyltransferases	3255574	Metabolism; Metabolism of Terpenoids and Polyketides; Prenyltransferases
Lysine biosynthesis	3237044	Metabolism; Amino Acid Metabolism; Lysine biosynthesis
Glutathione metabolism	3218649	Metabolism; Metabolism of Other Amino Acids; Glutathione metabolism
Cell cycle - Caulobacter	3208479	Cellular Processes; Cell Growth and Death; Cell cycle – Caulobacter
Protein export	3165319	Genetic Information Processing; Folding, Sorting and Degradation; Protein export
Histidine metabolism	3086446	Metabolism; Amino Acid Metabolism; Histidine metabolism
Butanoate metabolism	2983385	Metabolism; Carbohydrate Metabolism; Butanoate metabolism
Folate biosynthesis	2955062	Metabolism; Metabolism of Cofactors and Vitamins; Folate biosynthesis
Bacterial secretion system	2905789	Environmental Information Processing; Membrane Transport; Bacterial secretion system
Fatty acid metabolism	2863083	Metabolism; Lipid Metabolism; Fatty acid metabolism
Fatty acid biosynthesis	2835300	Metabolism; Lipid Metabolism; Fatty acid biosynthesis
One carbon pool by folate	2832399	Metabolism; Metabolism of Cofactors and Vitamins; One carbon pool by folate
Propanoate metabolism	2791332	Metabolism; Carbohydrate Metabolism; Propanoate metabolism
DNA replication	2777888	Genetic Information Processing; Replication and Repair; DNA replication

Translation factors	2721737	Genetic Information Processing; Translation; Translation factors
Sulfur relay system	2691233	Genetic Information Processing; Folding, Sorting and Degradation; Sulfur relay system
Nicotinate and nicotinamide metabolism	2591603	Metabolism; Metabolism of Cofactors and Vitamins; Nicotinate and nicotinamide metabolism
Tyrosine metabolism	2589543	Metabolism; Amino Acid Metabolism; Tyrosine metabolism
Citrate cycle (TCA cycle)	2534168	Metabolism; Carbohydrate Metabolism; Citrate cycle (TCA cycle)
Thiamine metabolism	2479804	Metabolism; Metabolism of Cofactors and Vitamins; Thiamine metabolism
Streptomycin biosynthesis	2475931	Metabolism; Biosynthesis of Other Secondary Metabolites; Streptomycin biosynthesis
Glycerophospholipid metabolism	2374599	Metabolism; Lipid Metabolism; Glycerophospholipid metabolism
Cytoskeleton proteins	2257504	Cellular Processes; Cell Motility; Cytoskeleton proteins
Valine, leucine and isoleucine degradation	2252466	Metabolism; Amino Acid Metabolism; Valine, leucine and isoleucine degradation
Tuberculosis	2225048	Human Diseases; Infectious Diseases; Tuberculosis
Base excision repair	2138833	Genetic Information Processing; Replication and Repair; Base excision repair
Sulfur metabolism	2109318	Metabolism; Energy Metabolism; Sulfur metabolism
Glycerolipid metabolism	2102887	Metabolism; Lipid Metabolism; Glycerolipid metabolism
Riboflavin metabolism	2061369	Metabolism; Metabolism of Cofactors and Vitamins; Riboflavin metabolism
Selenocompound metabolism	1957284	Metabolism; Metabolism of Other Amino Acids; Selenocompound metabolism
Galactose metabolism	1910964	Metabolism; Carbohydrate Metabolism; Galactose metabolism
Amino acid metabolism	1872989	Unclassified; Metabolism; Amino acid metabolism
Lipopolysaccharide biosynthesis proteins	1774118	Metabolism; Glycan Biosynthesis and Metabolism; Lipopolysaccharide biosynthesis proteins
beta-Alanine metabolism	1711824	Metabolism; Metabolism of Other Amino Acids; beta-Alanine metabolism
Drug metabolism - cytochrome P450	1711131	Metabolism; Xenobiotics Biodegradation and Metabolism; Drug metabolism - cytochrome P450
Metabolism of xenobiotics by cytochrome P450	1693711	Metabolism; Xenobiotics Biodegradation and Metabolism; Metabolism of xenobiotics by cytochrome P450
Nucleotide excision repair	1693050	Genetic Information Processing; Replication and Repair; Nucleotide excision repair
Cell motility and secretion	1672804	Unclassified; Cellular Processes and Signaling; Cell motility and secretion
Other transporters	1663865	Unclassified; Cellular Processes and Signaling; Other transporters

Suppl. Table S1 — Major (list of top 100) KEGG modules present in the phycosphere of *Isochrysis galbana*